REMARKS

Claims 1–2, 4–36, and 93–145 are pending. For the sake of brevity, the term "CSH" is used herein to refer to "calcium silicate hydrate."

Amendments to the Specification

Table 4 has been amended to correct the bulk density of Celite Micro-Cel E® to 180 kg/m^3 (0.18 g/cm^3). The change corrects a typographical error and does not constitute new matter. The bulk density of Micro-Cel E® is provided in a number of public sources. For example:

http://www.powderandbulk.com/resources/bulk_density/material_bulk_density_chart_d.htm

a copy of which is attached as EXHIBIT A, provides a value of 0.14–0.19 g/cm^3, which brackets the amended value.

Amendments to the Claims

Claims 1, 4, 20, and 35–36 have been amended to recite "low *bulk* density calcium aluminum silicate." Support for the amendments is found, for example, in Table 4, in which a row is labeled "Tamped Dry Bulk Density," and at ¶ **[0020]**, which also provides a range of densities. Table 4 indicates that samples of CSH from different sources have different bulk densities.

Claims 1, 35, and 36 have been amended to recite "wherein the bulk density of low bulk density calcium silicate hydrate is from about 0.015 g/cm^3 to about 1.5 g/cm^3." Support for this amendment is found, for example, in original claim 3 and in the specification in ¶ **[0020]** ("Low density CSH accelerant has a bulk density of about between 0.015 g/cm^3 and 1.5 g/cm^3").

Claims 1, 35, and 36 have been amended to recite "A method *for accelerating the curing*" of a cementitious article. Support for the amendments is found, for example, at ¶ **[0016]** ("A seventh embodiment provides a method accelerating the curing of concrete and cementitious composites, including fiber cement, using low-density calcium silicate hydrate.").

Claim 14 has been amended to recite "cellulose fiber." Support for the amendment is found, for example, in the specification at ¶¶ **[0031]** and **[0043]**. Also, the term "poly-fiber" has been replaced with "polymer fiber," which Applicant believes is synonymous.

Claim 36 has been amended to clarify that the cementitious article is cured underwater. Support for the amendment is found, for example, in the specification at ¶ **[0037]** ("Cementitious mixtures comprising between about 0.5% and 20% by weight low-density calcium silicate hydrate are useful ... for underwater applications.").

Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 1–92 stand rejected under 35 U.S.C. § 112, second paragraph as indefinite. The Examiner states that the term "low density calcium silicate hydrate" is vague and indefinite. Claims 1, 4, 20, and 35–36 have been amended to recite "low *bulk* density calcium aluminum silicate."

Independent claims 1, 35, and 36 have been amended to recite "the bulk density of low bulk density calcium silicate hydrate is from about 0.015 g/cm^3 to about 1.5 g/cm^3." Applicant respectfully submits that these claim amendments particularly point out the claimed subject matter, and consequently, the rejection is overcome. The remaining pending claims are dependent on claim 1 and consequently incorporate all of the limitations of claim 1. Accordingly, Applicant respectfully submits that the rejections of these claims is also overcome.

Rejections Under 35 U.S.C. §§ 102

Claims 1–92 stand rejected under 35 U.S.C. §§ 102(a) and 102(b) as anticipated by Duselis I (U.S. Patent No. 6,506,248), Gleeson et al. (U.S. Patent No. 6,572,697), Merkley et al. (U.S. Patent No. 6,676,745), Duselis II (U.S. Patent No. 6,346,146), Barrable I (U.S. Patent No. 4,101,335), Barrable II (U.S. Patent No. 4,132,555), Leture et al. (U.S. Patent No. 5,709,743), Chase (U.S. Patent No. 5,383,967), Motomura (JP 01318080), or Tamai et al. (JP 2001028492). In order to anticipate a claim, a reference must disclose or suggest every limitation of the claim.

Applicants respectfully submit that, except for Leture et al., none of the cited references discloses or suggests an accelerant of any kind for curing a cementitious material or a method of accelerating the curing of a cementitious material using the same.

Duselis I & Duselis II. Duselis I and Duselis II are directed to cementitious products comprising CSH with low densities and high strengths, for example, as illustrated in FIG. 1 of those patents. Neither Duselis I nor Duselis II discloses or suggests a method for accelerating the curing of a cementitious material using CSH.

Gleeson et al. Gleeson et al. is directed to low density fiber cement articles comprising microspheres, optionally in combination with another low density additive such as CSH. Gleeson et al. at 3:58–62. Gleeson et al. also discloses that formulations comprising CSH exhibit increased moisture expansion compared to controls. Gleeson et al. at 11:64–66. Gleeson et al. does not disclose or suggest a method for accelerating the curing of a cementitious material using CSH.

Merkley et al. Merkley et al. is directed to fiber cement products in which the fibers are treated to increase hydrophobicity. Merkley et al. at 4:60–64. Some embodiments include a density modifier, for example, CSH. Merkley et al. at 19:47–50. Merkley et al. does not disclose a method for accelerating the curing of a cementitious material using CSH.

Barrable I. Barrable I discloses two types of compositions: (1) compositions in which CSH is synthesized *in situ* from silica, and cement or lime, and (2) compositions in which preformed CSH is the only binder, *i.e.*, not using cement. Examples of compositions in the first class include Examples 1–9 (3:38–4:57) and Examples 11–16 (5:10–25). Applicant notes that, for this class of compositions, no CSH is present in the composition. Example 10 (4:58–5:8) is an example of a composition in the second class. Barrable I does not disclose a method for accelerating the curing of a cementitious material using CSH.

Barrable II. Barrable II discloses the same two types of compositions as Barrable I: (1) compositions in which CSH is produced *in situ* using cement as the source of calcium, and (2) compositions in which preformed CSH is the only binder, *i.e.*, not using cement. Examples of compositions in the first class include Examples 1–24 (5:12–8:38) and 26–30 (9:10–32). Example 25 (8:39–9:9) is an example of a composition in the second class.

Barrable II also does not disclose a method for accelerating the curing of a cementitious material using CSH.

Chase. Chase discloses the use of naturally occurring silica-containing minerals in the production of concrete. Chase discloses that silicate from these minerals reacts with lime in the Portland cement to form CSH during curing, but does not disclose a cementitious formulation in which CSH is added to a cementitious formulation as recited in the pending claims. Chase at 4:32–51. Chase does not disclose a method for accelerating the curing of a cementitious material using CSH.

Motomura. Submitted herewith in an Information Disclosure Statement is an abstract from Patent Abstracts of Japan of Motomura, which was cited by the Examiner. The abstract states that Motomura is directed to a pumpable grout comprising cement, a calcium silicate hydrate powder, a fine aggregate, and water. Motomura does not disclose a method for accelerating the curing of a cementitious material using CSH.

Tamai et al. Submitted herewith in an Information Disclosure Statement is an abstract from Patent Abstracts of Japan of Tamai, which was cited by the Examiner. According to the abstract, Tamai discloses an electromagnetic wave absorbing material comprising water, 20–60 wt% ferrite, 5–30 wt% ultralight calcium silicate hydrate, cement, siliceous material, and a fiber reinforcing material. Tamai et al. does not disclose or suggest a method for accelerating the curing of a cementitious material using CSH.

Applicant respectfully submits that because the above references do not disclose or suggest a method for accelerating the curing of a cementitious material using low bulk density CSH, the references do not disclose every element recited in amended claims 1, 35, and 36. Consequently, the rejections are overcome. Because claims 2 and 4–34 are dependent on claim 1, and recite additional features not disclosed or suggested in the cited references, Applicant respectfully submits that the rejections of those claims are also overcome.

Leture et al. The pending claims are distinguishable over Leture et al. Claims 1, 35, and 36 recite a method of accelerating the curing of a cementitious material using low bulk density CSH. Leture et al. discloses a setting and hardening accelerant that is an aqueous suspension of a finely ground material comprising at least 35% by dry weight of CSH. Leture

et al. at 3:47–4:9. The Leture et al. material is characterized by a sedimentation rate, which is correlated by the fineness of the particles. Leture et al. at 3:54–60. Leture et al. does not disclose a bulk density for the material, and in particular, that the bulk density is "between about 0.015 g/cm^3 and about 1.5 g/cm^3" as recited in amended claims 1, 35, and 36. The specification of the present application states that "[g]rinding or milling such particles inherently increases their packing density." ¶ **[0010]**. Consequently, the material disclosed in Leture et al. likely has a higher bulk density and is not a "low bulk density calcium silicate hydrate" as recited in amended claims 1, 35, and 36. Consequently, Applicant respectfully submits that the rejections of claims 1, 35, and 36 with respect to Leture et al. are overcome. Because claims 2 and 4–34 are dependent on claim 1, and recite additional features not disclosed or suggested in Leture et al., Applicant respectfully submits that the rejections of those claims are also overcome.

Rejections Under 35 U.S.C. § 103(a)

Claims 1–92 stand rejected, in the alternative, under 35 U.S.C. § 103(a) as obvious over Duselis I, Gleeson et al., Merkley et al., Duselis II, Barrable I, Barrable II, Leture et al., Chase, Motomura, or Tamai et al. A rejection for obviousness must meet three criteria: (1) the cited reference or references must disclose or suggest every element of the claim; (2) a suggestion or motivation, in the references or known to one skilled in the art, to modify or combine the references; and (3) a reasonable expectation of success. The suggestion to combine and the reasonable expectation of success must be found in the prior art. *In re* Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

As discussed above, none of the cited references, except for Leture et al., discloses or suggests a method for accelerating the curing of a cementitious material using CSH as recited in amended claims 1, 35, and 36. Because none of these references teaches a such a method using CSH in the recited density range is a curing accelerant, claims 1, 35, and 36 cannot be obvious over these references because one skilled in the art would have no reasonable expectation of success of accelerating the curing of a cementitious material using low bulk density CSH. Furthermore, Applicant respectfully submits that a rejection based on "optimum or workable ranges" is inappropriate where the prior art does not teach or suggest

the desirability of the result achieved. As discussed in MPEP § 2144.05, "[a] particular parameter must first be recognized as a result-effective variable, *i.e.,* a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." *In re Antonie*, 559 F.2d 618, 195 U.S.P.Q. 6 (C.C.P.A. 1977). Thus, for a rejection to be made based on "optimum or workable ranges," the prior art must first identify the result which the variable achieves. Consequently, Applicant respectfully submits that the rejections of claims 1, 35, and 36 over these references are overcome. Because claims 2 and 4–34 are dependent on claim 1, and recite additional features not disclosed or suggested in the cited references, Applicant respectfully submits that the rejections of those claims are also overcome.

Leture et al. Applicant respectfully submits that the pending claims are not obvious over of Leture et al. As discussed above, Leture et al. discloses a setting and hardening accelerant that is an aqueous suspension of a finely ground material comprising at least 35% by dry weight of CSH. As discussed above, this material is very different from the low bulk-density CSH recited in the pending claims. Leture et al. teaches that "crystallization seeds" should be finely ground. Leture et al. 2:46–48, 3:1–5, 3:31–33, 3:54–60. As discussed above, grinding CSH increases its bulk density. Leture et al. also teaches that the crystallization seed art is unpredictable. For example, all of the disclosed seeds are produced by finely grinding hardened cements, but some of these seeds provided no acceleration at all. What Leture et al. does not disclose or suggest is the bulk density of the "crystallization seeds" has any effect on the accelerant properties. Consequently, Leture et al. would not motivate one skilled in the art to use low bulk-density CSH, and in fact, the finely ground nature of the successful seeds, which likely have a bulk density outside the range recited in claims 1, 35, and 36, teaches away from a low bulk density material. Furthermore, the unpredictable nature of the results reported in Leture et al. would not provide a reasonable expectation of success for a potential accelerant material. Consequently, Applicant respectfully submits that amended claims 1, 35, and 36 are not obvious over Leture et al. Because claims 2 and 4–34 are dependent on claim 1, and recite additional features not disclosed or suggested in Leture et al., Applicant respectfully submits that the rejections of those claims are also overcome.

Rejections for Non-Statutory Double Patenting

Claims 1–92 stand rejected under the judicially created doctrine of non-statutory double patenting over Duselis I, Duselis II, Gleeson et al., and Merkley et al. Applicant respectfully submits that the claims of the cite references neither disclose or suggest that CSH accelerates the curing of a cementitious material as recited in claims 1, 35, and 36 of the present application. Because none of the claims in these references teaches or discloses CSH as an accelerant, the amended claims 1, 35, and 36 are not obvious over the claims of the cited references. Consequently, Applicant respectfully submits that the rejections of claims 1, 35, and 36 are overcome. Because claims 2 and 4–34 are dependent on claim 1, Applicant respectfully submits that the rejections over claims 2 and 4–34 are also overcome.

New Claims 93–145

New claims 93–145 correspond to original claims 40–92, rewritten to depend on claim 1. The only significant differences between the new claims and the corresponding original claims are claims 103, 115, and 135, which correspond to original claims 50, 62, and 82. The original claim recite that "the additional aggregate is a siliceous aggregate," whereas the new claims recite that "the additional aggregate is a siliceous aggregate *or an aluminosilicate aggregate.*" Support for the recitation of an aluminosilicate aggregate is found in original claims 51, 63, and 83, which recite fly ash and/or bottom ash, both of which are properly referred to as aluminosilicate aggregates. Further support is found in the specification at ¶ **[0032]**, which also refers to "fly and bottom ash," as well as to "clay, kaolin, ... mica, metakaolin" all of which are also aluminosilicates. For the reasons provided above, Applicant respectfully submits that claims 40–92 are patentable over the cited references.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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